

ABSTRACT

Disclosed are methods and compositions that are related to the production of erythropoietin. The disclosed compositions generally comprise a poly amino acid, such as a poly amino acid comprising one or more glutamic acid residues. The production of erythropoietin by use of the disclosed compositions and methods can take place *in vivo*, in which the proliferation of a subject's erythropoietin-producing cells leads to an increased level of production of erythropoietin, *in vitro*, in which increased proliferation of cultured erythropoietin-producing cells leads to an increased production of erythropoietin, *ex vivo*, in which cells or tissues harvested from a subject produce erythropoietin. The disclosed compositions can be administered to a subject or applied to cells or tissues to stimulate increased production of erythropoietin. The disclosed compositions and methods can be used, for example, to treat anemia, such as anemia associated with diseases and disorders such as chronic renal failure, end stage renal disease, malignancies, HIV infections and AIDS, rheumatoid arthritis, myeloma, and myeloplastic syndrome, and other diseases and disorders.